J. M. KELLEY.

PUMP.

APPLICATION FILED APR. 8, 1918.

1,309,987.

Patented July 15, 1919.

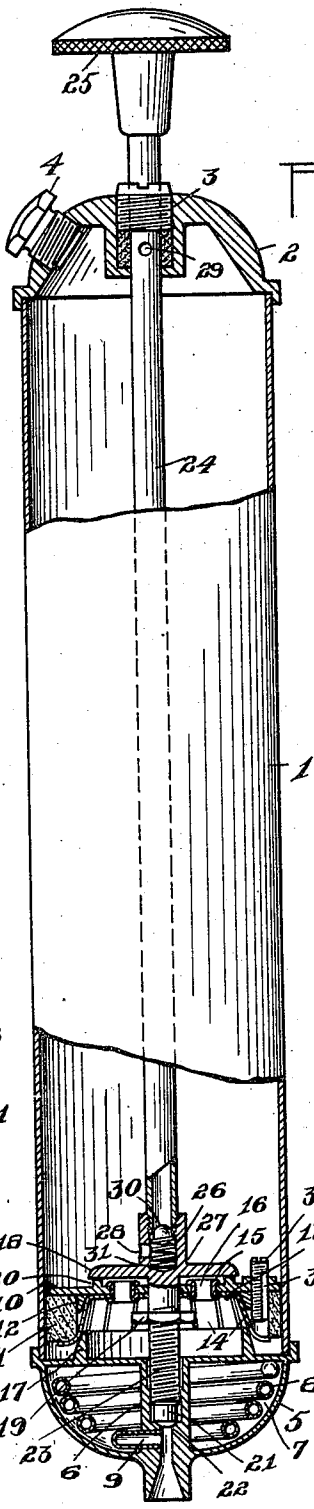


FIG. 1

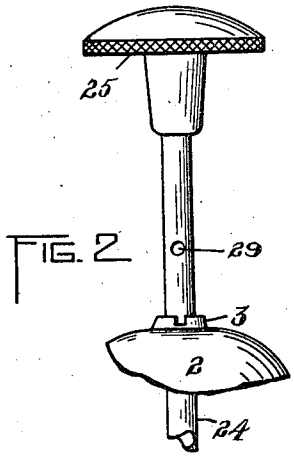


FIG. 2

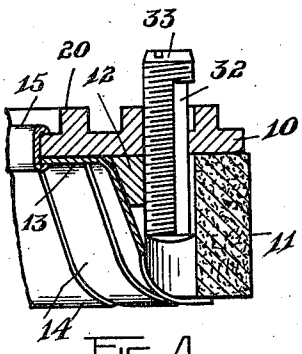


FIG. 4

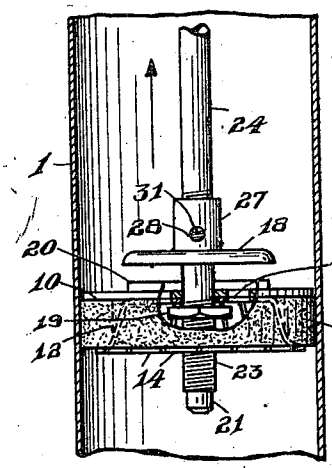


FIG. 3

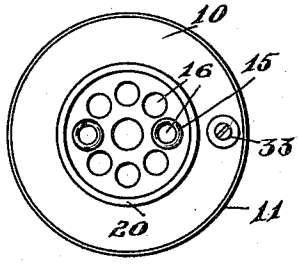


FIG. 5

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PUMP.

1,309,987. Specification of Letters Patent. Patented July 15, 1919.

Application filed April 8, 1918. Serial No. 227,368.

To all whom it may concern:

Be it known that I, JOHN M. KELLEY, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The present invention relates to pumps, and more particularly to a piston packing, an object of this invention being to provide an improved piston which will make the use of a leather cup unnecessary, while giving at the same time all the advantages of, and being superior to, the leather cup.

To these and other ends the invention consists of certain parts and combinations of parts, all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:—

Figure 1 is an axial section through a fire extinguisher embodying the present invention;

Fig. 2 is a detail view showing the inlet end of the air inlet passage open;

Fig. 3 is a detail sectional view, showing the piston shifted on a piston rod in such a manner as to open the by-pass;

Fig. 4 is an enlarged detail view of the adjustable relief passage; and

Fig. 5 is a detail view of the upper face of the piston.

The present invention is shown as embodied in a fire extinguisher which forms the subject-matter of a divisional application filed by me on August 28, 1918, Serial No. 252,108. This fire extinguisher embodies an open-ended tubular member 1 of the cylinder, which also embodies a head 2 provided with a packing gland 3 and a filling opening closed by a plug 4. The cylinder also embodies a head 5 provided with a discharge passage which, in this instance, is formed by a tube 6 extending through a chamber 7 in the head 5. This chamber 7, in this instance, incloses an air compressing chamber 8 which is in the form of a long narrow tube coiled about the tube 6 with one end closed and the other end opening at 9 to the discharge passage in the tube 6.

The piston, which forms the subject-matter of this invention, embodies a metal plate 10, against which a ring 11 of packing material, such as felt, rests, said ring being centered by a ring-shaped member 12 abutting the plate 10 within the packing ring 11. The packing ring may be held to the plate 10 by a plate 13 which has a plurality of laterally-bent fingers 14 at its edges, said fingers centering the ring 12 and also engaging and overhanging the packing ring 11, thus acting on the ring not only to hold it to the plate 10, but to expand such ring, due to the fact that the fingers 14 are of spring material. Eyelets 15 may pass through the plates 14 and 10 to secure them together, and at the same time serve to provide ports 16, other ports being provided by registering openings in both plates so that an angular series of ports is formed. The spring fingers 14 are also adapted to engage with an annular spreading device 17 formed on the head 5 to coöperate with the fingers in such a manner as to move them outwardly in order to press the packing ring 11 firmly against the walls of the cylinder 1, thus preventing the passage of liquid past the packing ring.

The piston may have a slight movement on the piston rod between a disk 18 on the rod and a nut 19 on said rod. This movement is provided in order that when the piston rod is moved outwardly the piston, owing to its frictional contact with the side walls of the cylinder, will not move until the nut 19 coöperates with it, and in this way the annular seat 20 which surrounds the ports 16 will move out of coöperation with the disk 18, thus permitting the fluid or liquid which is stored within the cylinder 1 above the piston to flow to the inner or under side of the piston. When the piston is moved in the opposite direction, this frictional contact between the piston and the cylinder walls will hold the piston until such time that the disk 18 coöperates with the annular seat 20, thus closing the port and permitting the liquid to be forced by the piston through the discharge tube 6. While the piston is in its innermost or lower position, the by-pass 16 may be closed, and this closing may be effected by a tapered end 21 of an extension on the piston rod coöperating with the seat 22 in the discharge passageway, said seat being positioned on the inner side of the end 9 of the air compression chamber. The piston rod extension may be also screw-threaded at 23 in order that the nut 19 may be fitted thereon, and also that the interior threaded walls of the tube 6 may be engaged to lock the piston in its innermost position, where its packing

ring 11 is forced outwardly against the walls of the cylinder by the spreader 17.

The piston rod may be formed by a tube 24 working through the packing gland 3 and having a knob 25 at its outer end. The inner end of this tube 24 is screw-threaded and engages with the internally-threaded walls of a chamber 26 formed in a casting 27, which carries the disk 18 and the screw-threaded portion 23. This chamber 26 has a port 28 opening to the cylinder, while the tubular rod 24 has a port 29 which, when the rod is in the position shown in Fig. 1, lies within the packing gland 3 so that the air inlet passage is closed to the interior of the cylinder. When the rod is withdrawn this port 29 is carried beyond the packing gland and permits the entrance of air by way of the tube 24 and the port 28. A ball valve 30 is situated within the chamber 26 and seats against the lower end of a tube 24, being held to the seat by a helical spring 31 within the chamber. This ball valve prevents the liquid being discharged through the tube 24 when the piston is moved from the position shown in Fig. 1, to cause the liquid to flow to the under side of the piston.

A relief passage 32 is provided in the piston, and is formed by a slot in a screw 33 which is adjustably mounted in the piston plate 10, so that the size of the relief passage may be varied in order to secure the most effective action.

In the use of the extinguisher, the parts are adjusted to the positions shown in Fig. 1, and the filling plug 4 being removed, the fire extinguisher fluid, such as carbon-tetrachlorid, is introduced into the cylinder above the piston, after which the plug 4 is fitted in the filling opening and the extinguisher is ready for use. When it is desired to use the extinguisher, the piston rod is turned so as to disengage the screw-threaded projecting end from the walls of the discharge tube 6, thus opening the discharge passageway. After the piston rod has been disengaged from the tube 6, it is pulled outwardly, thus causing the piston to move on the rod, due to the frictional engagement between the packing ring 11 and the interior walls of the cylinder 1, thus opening the ports 16. Further movement of the piston rod will cause the piston to travel toward the upper or rear end of the cylinder, thus causing the liquid to flow to the opposite face of the piston. After the piston has been moved to the limits of its movement, the piston rod is forced in the opposite direction, thus bringing the disk 18 against the ring 20 and closing the ports 16, so that the force of the piston acts on the liquid and ejects it from the cylinder through the discharge tube 6. During the movement of the piston, a small amount of the liquid travels through the relief passage 32 and prevents the choking action in the discharge orifice 6. When the piston is in its innermost position, the packing 11 is held in firm engagement with the walls of the cylinder by the spreading ring 17 which acts on the spring arms or fingers 14 to force the packing ring 11 outwardly. The liquid in the chamber 1 is, during the nonuse of the extinguisher, held from leakage by way of the air inlet port which relieves the vacuum on the upper face of the piston.

From the foregoing it will be seen that there has been provided a packing ring which dispenses with the cupped piston, and yet firmly coöperates with the walls of the cylinder. This packing ring is so supported that it may be forced outwardly against the walls of the cylinder by a spreader arranged at the bottom of the cylinder, thus maintaining the packing in condition for proper coöperation with the walls of the cylinder during the movement of the piston.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A pump piston embodying a plate, a packing ring, and resilient fingers retaining said packing ring in contact with the plate and acting to expand said ring against the walls of the cylinder.

2. A piston embodying two plates, one of which is formed at its edges with deflected spring fingers, and a packing ring held between said fingers and the other plate.

3. In a pump, a cylinder, a piston operating in the cylinder and embodying a plate, a ring of packing resting against the plate, resilient fingers retaining the packing ring against the plate and acting to expand the ring against the walls of the cylinder, and an annular spreader within the cylinder engaging said fingers to hold the packing ring expanded.

JOHN M. KELLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."